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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,960	07/03/2003	Olgica Bakajin	IL-11046	6753

7590 11/30/2005

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EXAMINER
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MENON, KRISHNAN S

ART UNIT	PAPER NUMBER
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1723

DATE MAILED: 11/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/613,960	BAKAJIN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Krishnan S. Menon	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-15 and 17-46 is/are pending in the application.
- 4a) Of the above claim(s) 20-44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-15,17-19,45 and 46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                         |                                                                             |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                                |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____                                                             | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

Claims 1,3-15 and 17-46 are pending, of which claims 20-44 are withdrawn from consideration as amended, 10/14/05.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1,3-15,17-19,45 and 46 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitation, "elastically compressed", has no supporting disclosure in the specification or claims as originally filed. Figures 1C and 1D may provide disclosure for "compressed", but not "elastically compressed".

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

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regards as the invention. Claim 12 lacks antecedent basis – its dependency to claim 1 is missing.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1,3-15,17-19, 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dai et al (US 2004/0149209) in view of Noca' 810.

Claims 1 and 45: Dai teaches a carbon nanotube mesh comprising a plurality of intertwined free-standing carbon nanotubes (paragraph 4, examples 1 and 2), densely packed (paragraph 68), fixedly attached to a substrate which is useful for separating, concentrating or filtering molecules (paragraphs 44, 2). Dai also teaches the process as claimed in claim 45. However, Dai does not teach the specifics of the structure of the microfluidic channel for the device, such the channel and the cover. Noca teaches the specific structure of the microfluidic channel with cover for use in separation processes (figures 5 and 6, abstract, col 4 line 15 – col 5 line 37). It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Noca in the teaching of Dai for the structural details that are missing from the Dai reference for making the device for its intended use. With respect to the 'elastically compressed', the

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carbon nanotubes in the channel with cover, as taught by the references, can have some degree of inherent compression because they are random grown and densely packed, and the carbon nanotubes can be inherently elastic, like that of the applicant.

Re Claims 3-19, Noca teaches all the structural details as follows:

Claim 3: channel filled with the mesh – see figure 5 at 54.

Claim 4: nanotube mesh without filling the channel – see col 6 lines 45-54 wherein it teaches any size, shape and spacing.

Claims 5-7: more than one mesh – see figure 6. complete or partial fill of the nanotubes – see col 6 lines 45-54.

Claim 8 recites intended use. See abstract.

Claims 9-11 – functionalized/derivatized – see col 8 lines 33-47.

Claim 12: pore size, etc – col 5 lines 20-27.

Claims 13 - 15: etched as a groove, cover layer, anodically bonded ((conventional MEMS process) – fig 5 and 6, col 10 lines 47-67.

Claim 17: more than one channel – fig 6

Claims 18 and 19: The references do not teach the nubbins as claimed.

However, since Dai in view of Noca teach the carbon nanotube mesh (54) as integral with or embedded in the channels (68) (Noca: col 10 lines 47-67), such nubbins become redundant and unnecessary. Ex Parte Wu.

Claim 46: Pressure driven flow is inherent in the device of Dai in view of Noca, even if the references do not specifically teach so. Under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the

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method claimed, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324, 231 USPQ 136 (Fed. Cir. 1986)

### ***Response to Arguments***

Applicant's arguments filed 10/14/05 have been fully considered but they are not persuasive.

With respect to Dai in view of Noca, the amendment does not overcome the rejection, as pointed out in the rejection. Noca reference in this rejection is used only to show the channel and cover for the sieve, and therefore, the Noca teaching of ordered nano-features is not relevant. Claim 46 was rejected on the basis of inherency of the process; applicant has not provided any reason or evidence that the device would not perform the process as claimed.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Krishnan S. Menon  
Patent Examiner  
November 17, 2005

  
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TECHNOLOGY CENTER 1700